JAPANESE [JP,2000-353710,A]

[Translation done.]

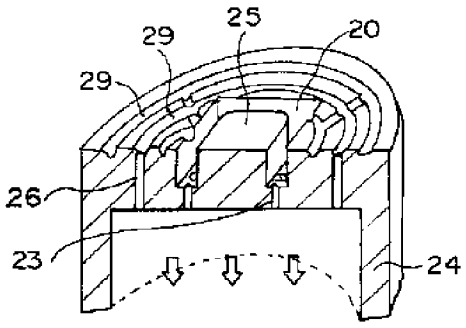
DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the exfoliation from the dicing tape of the semiconductor pellet in the manufacturing process of a semiconductor device. It is especially applied to a die bonder, a flip chip bonder, a tray stuffing device, etc.

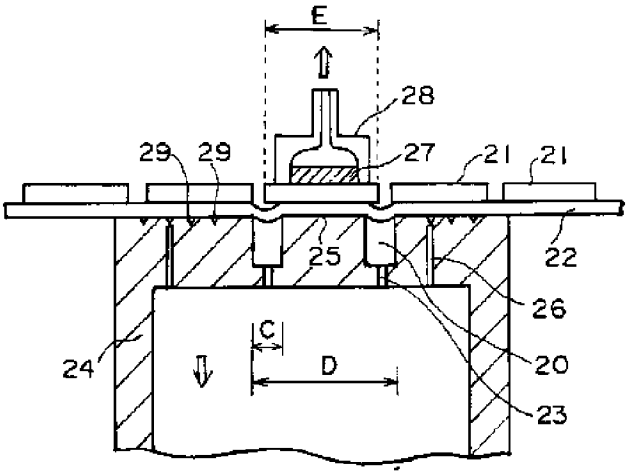
[0002]
[Description of the Prior Art]Generally, in the process of manufacturing the semiconductor device of a pellet type, predetermined thin-film-fabrication processing is performed to a semiconductor wafer, and forming many semiconductor pellets collectively is performed. And the adhesive tape (it is called a dicing tape) which becomes the back of this semiconductor wafer from a synthetic resin etc. is stuck. The semiconductor wafer which stuck the dicing tape is divided into each semiconductor pellet by full cutting dicing. Then, a predetermined examination is done, the semiconductor pellet of an excellent article is thrust up, and

Drawing selection Representative draw

(a)



(b)



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it thrusts up by a pin, and takes out from a semiconductor wafer. In this process, to be stabilized without doing damage to a semiconductor pellet, when thrusting up a semiconductor pellet and thrusting up by a pin, and to be able to take out is demanded.

[0003]Next, the problem of a Prior art is explained using drawing 13 and drawing 14. Drawing 13 is a perspective view showing the section of the main part of the device in connection with the conventional typical pellet pickup mechanism. Generally the semiconductor pellet 1 is supplied to a pellet pickup mechanism part in the state where aligned at the dicing tape 2, and it was stuck, and was stuck on the ring frame 3. The semiconductor pellet 1 is stuck on the shape of a semiconductor wafer. That is, the back of a semiconductor wafer is stuck on the dicing tape 2, along with a dicing line, full cutting dicing of the semiconductor wafer is carried out, and it is divided into each semiconductor pellet 1. Each semiconductor pellet 1 is maintaining the state where it was stuck on the dicing tape 2 where full cutting dicing is carried out. The ring frame 3 is constituted so that it can carry out movable free horizontally with the mechanism which is not illustrated. The backup holder 4 is arranged at the lower part of the dicing tape 2, and it is installed so that up-and-down motion may be possible, where it thrust up in the center of backup holder 4 inside, it thrust up with the pin 5 and the pin holder 6 and the pressure-from-below shaft 7 are connected with one, respectively. Vacuum suction of the backup holder 2 inside is carried out. It is on the semiconductor pellet 1, and it is constituted so that the collet 8 for semiconductor pellet adsorption may be arranged right above a pressure-from-below pin.

[0004]Drawing 14 is a sectional view explaining the pickup procedure in the same conventional pellet pickup mechanism as drawing 13. The semiconductor pellet 1 is stuck on the dicing tape 2. are installed in the lower part of the dicing tape 2 so that the backup holder 4 may contact the dicing tape 2 exactly, and thrust up in the center of an inside, and the pin 5 and the pressure-from-below pin holder 6, and the pressure-from-below shaft 7 are connected one by one -- the upper and lower sides -- it is installed movable. It was formed all over the small slot 10 removing a peripheral part on the upper surface (tape mounting surface) of the backup holder 4, and each slot 10 is connected in the portion which is not illustrated.

And it is connected also with the inside of the backup holder 4 by the hole 9.

Therefore, if vacuum suction of the inside of the backup holder 4 is carried out, the slot 10 of the surface of the

backup holder 4 and the crevice between the dicing tapes 2 will be in a vacua, and the dicing tape 2 can be adsorbed to the backup holder 4, and it can fix. It is assumed that the alignment of the semiconductor pellet 1 and the backup holder 4 is beforehand ended by the predetermined means (not shown).

[0005]Drawing 14 (a) is a figure showing the initial state of pickup operation. If pickup operation starts, it thrusts up like drawing 14 (b) first, and the pin 5, the pressure-from-below pin holder 6, and the pressure-from-below shaft 7 go up, and just before the tip of the pressure-from-below pin 5 contacts the dicing tape 2, it will go up. The collet 8 descends and stands by till the height decided beforehand simultaneously. Next, it thrusts up like drawing 15 (a) and the pin 5 goes up further. Although the semiconductor pellet 1 is made the pressure-from-below pin 5, the dicing tape 2 is pulled to the bottom with the vacuum suction of about 420 mmHg of the slot 10 of the backup holder 4, and it begins to separate gradually from the end of the semiconductor pellet 1. If it furthermore thrusts up and the pin 5 is gone up, like drawing 15 (b), at last, the dicing tape 2 will separate thoroughly from the semiconductor pellet 1, and will be adsorbed by the collet 8. Finally it thrusts up like drawing 16 and the pin 5 returns to the first position, i.e., the position of drawing 14 (a), and the collet 8 conveys the semiconductor pellet 1 to a next process, and ends pickup operation.

[0006]

[Problem(s) to be Solved by the Invention]The problem in the conventional pickup method described above is explained referring to drawing 17. Drawing 17 is a sectional view explaining the state of a semiconductor pellet and a dicing tape of separating, and drawing 17 (a) expresses the initial state of pressure from below. The semiconductor pellet 1a is an object pellet of a pickup, and the semiconductor pellets 1b and 1c are semiconductor pellets of the position which adjoins this. When removing a dicing tape and a semiconductor pellet generally, the portion of a pellet end does not separate most easily, and if an end begins to separate, peeling once advances by load smaller than load required for the peel-off of an end. Also by this conventional example, the P point 11 of the end of the semiconductor pellet 1c is a portion which does not separate most easily, in the stage in early stages of pressure from below, no portions separate yet but the semiconductor pellets 1b and 1c of the position which adjoins simultaneously will be raised by the semiconductor pellet 1c (drawing 17 (a)). However, in such the state, to the semiconductor pellets 1b and 1c, vacuum absorption power

is working with the backup holder 4, and sufficient load F12 which can serve as a cause of tape peeling has occurred. Therefore, peeling by the P point 11 occurs, peeling advances to the inside of the semiconductor pellet 1 gradually at the same time the amount of pressure from below increases, and the semiconductor pellet 1a separates from a dicing tape thoroughly in the process eventually shown in drawing 14 thru/or drawing 16.

[0007]However, when taking up the thin semiconductor pellet whose thickness to which development is advanced briskly in recent years is 50 micrometers - about 100 micrometers, it will be in the state where it is shown in drawing 17 (b). Although the load composition committed on the pellet 1a for a pickup is not different from drawing 17 (a), since it is thin, the semiconductor pellet 1a carries out elastic deformation of it according to the load F13. If pressure from below furthermore progresses, before the point P11 will begin to separate finally, it destroys from the point Q14 of the semiconductor pellet 1a that bending stress thrusts up exceeding the intensity of the semiconductor pellet 1a, and the tip of the pin 5 hits. Although what is necessary is just to shorten distance from Q point to F point in order to avoid such a problem, In order to remove the whole semiconductor pellet efficiently, it thrusts up with the size B of the semiconductor pellet 1a, and 1 / 2 - 1/3 are suitable for the ratio (A/B) of the interval A of the pin 5, and parenchyma is impossible for contracting the distance of the point Q and the point F by the big pellet of ten or more mm squares. Although the device which lowers the adhesive power of a dicing tape as destructive preventive measures of a semiconductor pellet is also performed, When the thickness of a semiconductor pellet is set to 50 micrometers or less and size exceeds 10 mm squares, the adhesive power of a dicing tape must be controlled very weakly, And it is difficult to require delicate speed control which does not give a shock if possible by a pressure-from-below pin, and to stabilize and realize in a actual production site.

[0008]As stated above, there was a problem which destroys a thin semiconductor pellet in the present pickup. Although the method of exfoliating a semiconductor pellet from a dicing tape by attracting a dicing tape is shown in publicly known art (JP,7-45558,A, JP,6-318636,A), By this method, a dicing tape is removed at a stretch, and it is immediately divided in an ultra-thin semiconductor pellet of 100 micrometers or less, and is not an effective method. This invention is made by such a situation and a semiconductor pellet can be certainly removed from a dicing tape, The manufacturing method of the semiconductor device using the pellet pickup apparatus which enables the pickup of the

ultra-thin semiconductor pellet which cannot take up by the pressure from below by the conventional pressure-from-below pin, and this pickup is provided.

[0009]

[Means for Solving the Problem]This invention has an outside of larger size than a predetermined semiconductor pellet used as a candidate for a pickup in a backup holder upper center (just under a predetermined semiconductor pellet which should take up) of a pellet pickup apparatus, When said predetermined semiconductor pellet which should take up is laid in a backup holder, a peripheral edge of said predetermined semiconductor pellet forms a slot arranged on it along a peripheral side of said predetermined semiconductor pellet, By carrying out vacuum suction of the inside of this slot, removing said predetermined semiconductor pellet from a dicing tape has the feature, and removing a semiconductor pellet from that peripheral edge has the feature. How to provide a hollow in the center of a backup holder, and curve a semiconductor pellet downward in order to promote peeling, It is possible by using suitably a method of blowing off air from a center of a backup holder, and curving a semiconductor pellet upwards, and a method of raising a backup holder center section to remove a semiconductor pellet from a dicing tape still more certainly. An ultra-thin semiconductor pellet which cannot take up by a pressure-from-below method by the conventional pressure-from-below pin can be taken up.

[0010]Namely, a pellet pickup apparatus of this invention, A backup holder which supports a dicing tape which supports two or more semiconductor pellets, and has a flat tape mounting surface, It is arranged so that a peripheral edge of a predetermined semiconductor pellet stuck on said dicing tape on a tape mounting surface of said backup holder may project on it, And a slot formed in said tape mounting surface so that a periphery of said predetermined semiconductor pellet might be met, A means to adsorb said dicing tape on this slot by carrying out vacuum suction of said slot, When a collet which adsorbs said predetermined semiconductor pellet is provided and said slot adsorbs said dicing tape, it is characterized by said collet's adsorbing said predetermined semiconductor pellet, and tearing off from said dicing tape. Absorbing holes which adsorb said dicing tape may be made to be formed near the center of a field which said predetermined semiconductor pellet of said tape mounting surface was laid, and was surrounded by said slot. It may be made for near [the] the center to have become depressed in said field. It may be made to have further a device which moves said field up and down. It may be made to have further a device which turns high pressure gas to

said predetermined semiconductor pellet, and blows off near the center of said field.
[0011]A slot which adsorbs and fixes a portion on which semiconductor pellets other than said predetermined semiconductor pellet of said dicing tape are stuck by vacuum suction may be made to be formed in fields other than a field surrounded by said slot of said tape mounting surface. This invention is characterized by a manufacturing method of a semiconductor device comprising the following.
A process made to carry so that a peripheral edge of this semiconductor pellet may project on a slot which a dicing tape which supports two or more semiconductor pellets was formed in a flat tape mounting surface of a backup holder, and was formed in this tape mounting surface in a predetermined semiconductor pellet.
A process of adsorbing said predetermined semiconductor pellet by a collet, and tearing off this semiconductor pellet from said dicing tape while carrying out vacuum suction of said slot and making said dicing tape on this slot adsorbing.

[0012]
[Embodiment of the Invention]Hereafter, an embodiment of the invention is described with reference to drawings. First, the 1st example is described with reference to drawing 1 and drawing 2. It is a top view showing the tape mounting surface of a pellet pickup apparatus which displayed drawing 1 with the section perspective view of the pellet pickup apparatus, and where drawing 2 displayed the position of the semiconductor pellet by the dotted line. Drawing 1 (b) is a sectional view showing the peeling state of a dicing tape when taking up a semiconductor pellet. The slot 20 with the outside of larger size than the semiconductor pellet 21 is established in the center section of the backup holder 24 which is a fixture of the dicing tape which carried out attachment immobilization of the semiconductor pellet. The width C of the slot 20 is determined that the semiconductor pellet 21 is not destroyed in consideration of the thickness (in this example, it is 50 micrometers) of the semiconductor pellet 21. The relation between the outside dimension D of the slot 20 and the outside dimension E of the semiconductor pellet 21 is determined with the characteristic of the dicing tape 22, and the size of the semiconductor pellet 21, and, in any [of D>E and D=E] case, there may be. That is, in this invention, the outside of a slot is the almost same size as a semiconductor pellet.
[0013]Drawing 2 is a top view showing the tape mounting surface of the backup holder 24 of this example. It is arranged so that the peripheral edge of the predetermined

semiconductor pellet 21 for [which was stuck on the dicing tape 22 on the tape mounting surface of the backup holder 24 as shown in this figure] a pickup may project on it. And the slot 20 is formed in a tape mounting surface so that the periphery of said predetermined semiconductor pellet 21 may be met. If the effect of that peeling is taken into consideration, 1 mm or less is suitable for the projection part (deltat) to which the peripheral edge of the semiconductor pellet 21 laid on the pickup pellet supporter 25 surrounded by the slot 20 of the tape mounting surface has projected on the slot 20 from this supporter 25. The hole 23 is formed in the lower part of the slot 20, and the slot 20 and the inside of the backup holder 24 are connected via this hole 23. The slot 29 is formed in the tape mounting surface of the upper part of the backup holder 24 at concentric circle shape, and each slot 29 is connected several [on the circumference]. The slot 29 is also connected with backup holder 24 inside by several holes 26 currently formed in the pars basilaris ossis occipitalis.

[0014]In the early stages of pickup operation, it will be in a state like drawing 1 (b). By the means which is not illustrated beforehand, alignment of the semiconductor pellet 21 and the backup holder 24 is performed, and, subsequently vacuum suction of the inside of the backup holder 24 is carried out by about 430 mmHg. It is moved so that the collet 28 may contact the semiconductor pellet 21 upper part simultaneously, and vacuum suction of the collet 28 inside is carried out still more nearly simultaneous. The lower part of the collet 28 which is a portion which contacts the semiconductor pellet 21 comprises the porous body 27, and even if it adsorbs the semiconductor pellet 21 by vacuum suction, the semiconductor pellet 21 does not change. However, if vacuum suction of the inside of the backup holder 24 is carried out, slot 20 inside will also be in a vacua, and the dicing tape 22 is pulled downward and will be in the state where it separated from the peripheral part of the semiconductor pellet 21 finally (drawing 1 (b)). After beginning to separate selectively, the semiconductor pellet 21 is removed from the dicing tape 22 by the adsorption power of the collet 28 by moving the collet 28 upwards. The slot 29 can attract the dicing tape 22 to the backup holder 24 with vacuum absorption power. And it is supported so that the semiconductor pellet 21 may not separate with the vacuum absorption power produced into the slot 29. Though natural, the adhesive power of the dicing tape 22 is controlled by proper power possible [a pickup / enough] at the above process. In this example, a semiconductor pellet is certainly removed from a dicing tape, by the pressure from below by the conventional pressure-from-below pin, cannot

be taken up, for example, enables the pickup of an ultra-thin semiconductor pellet of 100 micrometers or less.
[0015]Next, the 2nd example is described with reference to drawing 3 and drawing 4. Drawing 3 and drawing 4 are the sectional views of the pellet pickup apparatus explaining the peeling state of a dicing tape when taking up a semiconductor pellet, and explain the principle in which a semiconductor pellet separates from a dicing tape. Drawing 3 expresses the initial state which adsorbs the target semiconductor pellet 31 by the collet 38. Are [of this invention] just going to be characterized by the slot 30, and it is formed in the tape mounting surface of the backup holder 34 so that the semiconductor pellet 31 for a pickup may be surrounded. And the field surrounded by the slot 30 of the tape mounting surface serves as a pickup pellet supporter which supports the predetermined semiconductor pellet 31 which is an object taken up, and this portion has the hollow 37. It is arranged so that it may project on the peripheral edge fang furrow part 30 of the predetermined semiconductor pellet 31 for [which was stuck on the dicing tape 32 on the pickup pellet supporter of the tape mounting surface of the backup holder 34] a pickup. The slot 39 which adsorbs the dicing tape 32 is similarly established in the tape mounting surface of the backup holder 34, and it has the function to press down the dicing tape 32 so that other fields may not be raised, when the collet 38 takes up the predetermined semiconductor pellet 31.
[0016]In the pickup pellet supporter of the center section of the backup holder 34, it becomes depressed, and 37 is formed. The hole 36 connected with the slot 35 and the slot 35 is established in the center section of the hollow 37, and these are connected with the inside of the backup holder 34, and are used for the vacuum absorption of the semiconductor pellet 31. Since vacuum absorption is carried out via the slot 35 at the time of the pickup of the semiconductor pellet 31, the semiconductor pellet 31 changes along the hollow 37. The peripheral edge (P point 33) of the semiconductor pellet 31 accompanying modification has bounded upwards, and can remove from the dicing tape 32, and power can be obtained. The hollow 37 forms the radius of curve in 20 mm in general in order for the P point 33 to be over and to reduce the load to the semiconductor pellet 31 for the amount of raisings below to fracture strength enough greatly as much as possible. In this example, a semiconductor pellet is certainly removed from a dicing tape, by the pressure from below by the conventional pressure-from-below pin, cannot be taken up, for example, enables the pickup of an ultra-thin semiconductor pellet of 100 micrometers or less. Since especially the hollow is

provided, a semiconductor pellet end bounds, and the amount of raisings is large, it removes, and power becomes large.

[0017]Next, the 3rd example is described with reference to drawing 4 (a). Drawing 4 (a) is a sectional view showing the peeling state of a dicing tape when taking up a semiconductor pellet. The slot 40 with the outside of larger size than the semiconductor pellet 41 is established in the center section of the backup holder 44 which is a fixture of the dicing tape which carried out attachment immobilization of the semiconductor pellet. The width of the slot 40 is determined that the semiconductor pellet 41 is not destroyed in consideration of the thickness (in this example, it is 50 micrometers) of the semiconductor pellet 41. The relation between the outside dimension of the slot 40 and the outside dimension of the semiconductor pellet 41 is determined with the characteristic of the dicing tape 42, and the size of the semiconductor pellet 41, and is an outside dimension of the outside dimension >= semiconductor pellet 41 of the slot 40. That is, the outside of the slot 40 is the same size mostly with the semiconductor pellet 41. The hole 47 is formed in the center portion of the tape mounting surface which supports the predetermined semiconductor pellet which should take up. The hole 43 is formed in the lower part of the slot 40, and the slot 40 and the inside of the backup holder 44 are connected via this hole 43. The slot 49 is formed in the tape mounting surface of the backup holder 44 upper part at concentric circle shape, and each slot 49 is connected several [on the circumference]. The slot 49 is also connected with backup holder 44 inside by several holes 46 currently formed in the pars basilaris ossis occipitalis.

[0018]After performing alignment of the semiconductor pellet 41 and the backup holder 44 beforehand, vacuum suction of the inside of the backup holder 44 is carried out by about 430 mmHg. It is moved so that the collet 48 may contact the semiconductor pellet 41 upper part simultaneously, and vacuum suction of the collet 48 inside is carried out still more nearly simultaneous. If vacuum suction of the inside of the backup holder 44 is carried out, slot 40 inside will also be in a vacua, and the dicing tape 42 is pulled downward and will be in the state where it separated from the peripheral part of the semiconductor pellet 41 finally. After advancing pickup operation to this state, the dicing tape 42 swells and peeling of the semiconductor pellet 41 makes it promote by making high voltage air blow off from the hole 47. The pressure of the air to add is determined that the whole dicing tape will not come floating from the size of a semiconductor pellet. In

this example, a semiconductor pellet is certainly removed from a dicing tape, by the pressure from below by the conventional pressure-from-below pin, cannot be taken up, for example, enables the pickup of an ultra-thin semiconductor pellet of 100 micrometers or less. Since especially high voltage air is added, it becomes much more easy to remove a semiconductor pellet.

[0019]Next, the 4th example is described with reference to drawing 4 (b). Drawing 4 (b) is a sectional view showing the peeling state of a dicing tape when taking up a semiconductor pellet. The slot 50 with the outside of larger size than the semiconductor pellet 51 is established in the center section of the backup holder 54 which is a fixture of the dicing tape which carried out attachment immobilization of the semiconductor pellet. The width of the slot 50 is determined that the semiconductor pellet 51 is not destroyed in consideration of the thickness (in this example, it is 50 micrometers) of the semiconductor pellet 51. The relation between the outside dimension of the slot 50 and the outside dimension of the semiconductor pellet 51 is determined with the characteristic of a dicing tape, and the size of a semiconductor pellet, and is an outside dimension of the outside dimension >= semiconductor pellet of a slot. The pickup pellet supporter of the tape mounting surface which supports the predetermined semiconductor pellet which should take up is connected with the movable shaft 57. The hole 53 is formed in the lower part of the slot 50, and the slot 50 and the inside of the backup holder 54 are connected via this hole 53. The slot 59 is formed in the tape mounting surface of the backup holder 54 upper part at concentric circle shape, and each slot 59 is connected several [on the circumference]. The slot 59 is also connected with backup holder 54 inside by several holes 56 currently formed in the pars basilaris ossis occipitalis.

[0020]After performing alignment of the semiconductor pellet 51 and the backup holder 54 beforehand and adjusting the pickup pellet supporter end of the movable shaft 57 upper surface to the same field as a tape mounting surface, vacuum suction of the inside of the backup holder 54 is carried out by about 430 mmHg. It is moved so that the collet 58 may contact the semiconductor pellet 51 upper part simultaneously, and vacuum suction of the collet 58 inside is carried out still more nearly simultaneous. If vacuum suction of the inside of the backup holder 54 is carried out, slot 50 inside will also be in a vacua, and the dicing tape 52 is pulled downward and will be in the state where it separated from the peripheral part of the semiconductor pellet 51 finally. After advancing pickup operation to this state, the movable shaft 57 is raised and peeling of the

dicing sheet 52 is promoted. In this example, a semiconductor pellet is certainly removed from a dicing tape, by the pressure from below by the conventional pressure-from-below pin, cannot be taken up, for example, enables the pickup of an ultra-thin semiconductor pellet of 100 micrometers or less. Since especially a movable shaft is used, it becomes easy to remove a semiconductor pellet.

[0021]Next, the 5th example is described with reference to drawing 5 and ****6. The perspective view, drawing 5 (b), and drawing 6 which drawing 5 (a) shows the section of a backup holder are a sectional view of the pellet pickup apparatus explaining the peeling state of a dicing tape when taking up a semiconductor pellet. The slot 60 with the outside of larger size than the semiconductor pellet 61 is established in the center section of the backup holder 64. The width of the slot 60 is determined that the semiconductor pellet 61 is not destroyed in consideration of the thickness (in this example, it is 50 micrometers) of the semiconductor pellet 61. The center section of the pickup pellet supporter of the tape mounting surface which supports the predetermined semiconductor pellet which should take up is connected with the movable shaft 67. The hole 63 is formed in the lower part of the slot 60, and the slot 60 and the inside of the backup holder 64 are connected via this hole 63. The slot 69 is formed in the tape mounting surface of the backup holder 64 upper part at concentric circle shape, and each slot 69 is connected several [on the circumference]. The slot 69 is also connected with backup holder 64 inside by several holes 66 currently formed in the pars basilaris ossis occipitalis.

[0022]After performing alignment of the semiconductor pellet 61 and the backup holder 64 beforehand and adjusting the pickup pellet supporter end of the movable shaft 67 upper surface to the same field as a tape mounting surface (drawing 5 (b)), vacuum suction of the inside of the backup holder 64 is carried out by about 430 mmHg. It is moved so that the collet 68 may contact the semiconductor pellet 61 upper part simultaneously, and vacuum suction of the collet 68 inside is carried out still more nearly simultaneous. If vacuum suction of the inside of the backup holder 64 is carried out, slot 60 inside will also be in a vacua, and the dicing tape 62 is pulled downward and will be in the state where it separated from the peripheral part of the semiconductor pellet 61 finally. After advancing pickup operation to this state, the movable shaft 67 is raised and peeling of the dicing sheet 62 is promoted. The center portion of the backup holder 64 of this example is a pickup pellet supporter, and has become a flexible region which can move up and down in the center section of this supporter. A

flexible region is connected with the movable shaft 67, and is moved by the movable shaft. In the pickup pellet supporter of backup holder 64 center, it becomes depressed, and 65 is provided. And as mentioned above, inside was constituted so that up-and-down motion was possible, and the hollow 65 is divided into the flexible region supported by the movable shaft 67 and the holding part of the circumference of it. The hole 70 connected with the hole 70, the slot 72, and the slot 72 is formed in the central part of the movable shaft 67, and the slot 71 is formed in the flexible region.

[0023]Drawing 5 (b) is a figure showing the early state in a pickup. The end of the semiconductor pellet 61 which is the target of a pickup is removed from the dicing tape 62. Next, if the movable shaft 67 is raised, the semiconductor pellet 61 will come (drawing 6 (a)) to be further removed from a dicing tape. If high voltage air is blown off from the hole 72 which stands in a row into the slot 71, peeling will be promoted further and a pickup will be completed eventually (refer to drawing 5 (a)). In this example, a semiconductor pellet is certainly removed from a dicing tape, by the pressure from below by the conventional pressure-from-below pin, cannot be taken up, for example, enables the pickup of an ultra-thin semiconductor pellet of 100 micrometers or less. Especially a semiconductor pellet will be gradually removed from an end by movement of a movable shaft, and it becomes easier to remove. Although one movable shaft was used in this example, even if it installs two or more, of course, it is satisfactory. It may install in the shape of the same axle. When especially the size of a semiconductor pellet is large, a movable shaft is divided in the shape of the same axle, and if the amount of dicing tape peel-off in one movable shaft is lessened, the breakage possibility of a semiconductor pellet can be lowered.

[0024]Next, the 6th example is described with reference to drawing 7 and drawing 8. The perspective view, drawing 7 (b), or drawing 8 which drawing 7 (a) shows the section of a backup holder is a sectional view of the pellet pickup apparatus explaining the peeling state of a dicing tape when taking up a semiconductor pellet. As shown in drawing 7 (a), the slot 80 with the outside of larger size than the semiconductor pellet 90 is established in the center section of the backup holder 81. The width of the slot 80 is determined that the semiconductor pellet 90 is not destroyed in consideration of the thickness (in this example, it is 50 micrometers) of the semiconductor pellet 90. The center section of the pickup pellet supporter of the tape mounting surface which supports the predetermined semiconductor

pellet which should take up is connected with the movable shafts 1, 2, and 3 (82, 83, 84). Formation arrangement of the movable shaft 2 (83) and the movable shaft 3 (84) is carried out one by one at concentric circle shape so that the movable shaft 1 (82) may be arranged at a center and movable shafts may surround this. The slot 80 and the inside of the backup holder 81 are connected. That is, the crevice between the wall of the backup holder 81 and the movable shaft 84 is in the slot 80 very. The slot 87 is formed in the tape mounting surface of the backup holder 81 upper part at concentric circle shape, and each slot 87 is connected several [on the circumference]. The slot 87 is also connected with backup holder 64 inside by several holes 86 currently formed in the pars basilaris ossis occipitalis.
[0025]First, from the tape mounting surface of the backup holder 81, the movable shafts 82 and 83 and the 84 whole are projected, and are raised. In this example, the upper surface of these movable shafts is raised to a position higher 0.5 mm - 1 mm than a tape mounting surface so that peeling may take place easily. Since vacuum suction of the backup holder 81 inside is carried out, the periphery of the predetermined semiconductor pellet 90 which should take up separates (drawing 7 (b)). Next, if the outside movable shaft 84 is dropped most, peeling will advance. At this time, in order to advance peeling certainly in this example, the movable shaft 84 is good to make it descend to a position lower 1 mm or more than the adjoining movable shaft 83 (drawing 8 (a)). Next, the movable shaft 83 is dropped to the falling position of the movable shaft 84, and peeling is advanced further. By making the semiconductor pellet 90 adsorb with the vacuum absorption power of the collet 89 after this, and raising the collet 89, the adsorption portion which remained is removed and work is completed.
[0026]As shown in drawing 6 (b) etc., of course, high voltage air can be sprayed from the slot 86, and peeling from the dicing tape of a semiconductor pellet can also be promoted. If there may be many movable shafts and there are than three, work will follow it easily so much. [more] This number is decided with semiconductor pellet size. In this example, a semiconductor pellet is certainly removed from a dicing tape, by the pressure from below by the conventional pressure-from-below pin, cannot be taken up, for example, enables the pickup of an ultra-thin semiconductor pellet of 100 micrometers or less. Especially the number of movable shafts will be increased, a semiconductor pellet will be gradually removed from an end by the movement, and it becomes easy to remove conventionally.
[0027]Next, the 6th example is described with reference to

drawing 9 and drawing 10. The perspective view, drawing 9 (b), and drawing 10 which drawing 9 (a) shows the section of a backup holder are a sectional view of the pellet pickup apparatus explaining the peeling state of a dicing tape when taking up a semiconductor pellet. The slot 100 with the outside of larger size than the semiconductor pellet 110 is established in the center section of the backup holder 101. The width of the slot 100 is determined that the semiconductor pellet 110 is not destroyed in consideration of the thickness of the semiconductor pellet 110. Unlike other flat fields of a tape mounting surface, the hollow is formed in the pickup pellet supporter of the tape mounting surface which supports the predetermined semiconductor pellet which should take up. And this supporter is driven by the movable shafts 1, 2, and 3 (102, 103, 104). That is, the movable shaft upper surface is a hollow. The movable shaft has in this axial symmetry and the structure where one pair of movable shafts 2 and 3 (103, 104) are arranged, respectively, focusing on the central movable shaft 1 (102). As for the lower part of the slot 100, the inside of the backup holder 101 is connected. The slot 107 is formed in the tape mounting surface of the backup holder 101 upper part at concentric circle shape, and each slot 107 is connected several [on the circumference]. The slot 107 is connected with backup holder 101 inside by several holes 108 currently formed in the pars basilaris ossis occipitalis.

[0028]After performing alignment of the semiconductor pellet 110 and the backup holder 101 beforehand and adjusting the pickup pellet supporter end on two or more upper surfaces of a movable shaft to the same field as a tape mounting surface (drawing 9 (a)), vacuum suction of the inside of the backup holder 101 is carried out by about 430 mmHg. And first, from the tape mounting surface of the backup holder 101, the movable shafts 102 and 103 and the 104 whole are projected, and are raised. In this example, the upper surface of these movable shafts is raised to a position higher 0.5 mm - 1 mm than a tape mounting surface so that peeling may take place easily. Since vacuum suction of the backup holder 101 inside is carried out, the periphery of the predetermined semiconductor pellet 110 which should take up separates. Since the movable shaft upper surface is a hollow, the periphery has curved upward and, as for the semiconductor pellet carried on it, peeling is easy (drawing 9 (b)).

[0029]Next, the outside movable shaft 104 is dropped most. however, enough, since the upper surface of the movable shafts 102, 103, and 104 is curving and the height of the movable shaft 103 is low, even if it lowers the movable shaft 104 enough -- it removes and power does not occur. If

the upper surface raises the movable shafts 102 and 103 together to the height which had a movable shaft first in order to prevent it, peeling will advance. At this time, in order to advance peeling certainly in this example, the movable shaft 104 is good to make it descend to a position lower 1 mm or more than the adjoining movable shaft 103 (drawing 10 (a)). Next, the movable shaft 103 is dropped, the movable shaft 102 is raised, and peeling is advanced further. Then, by making the semiconductor pellet 110 adsorb with the vacuum absorption power of the collet 109, and raising the collet 109, the adsorption portion which remained is removed and work is completed. Of course, a movable shaft is not limited to three steps and decided with semiconductor pellet size (drawing 10 (b)). In this example, a semiconductor pellet is certainly removed from a dicing tape, by the pressure from below by the conventional pressure-from-below pin, cannot be taken up, for example, enables the pickup of an ultra-thin semiconductor pellet of 100 micrometers or less. Especially the number of movable shafts will be increased, a semiconductor pellet will be gradually removed from an end by the movement, and it becomes easy to remove conventionally.

[0030]Next, the 7th example is described with reference to drawing 11 and ****12. The pellet pickup apparatus of this example uses two or more movable shafts for concentric circle shape like the 5th example (refer to drawing 7 (a)). The outline sectional view where drawing 11 explains operation of a movable shaft, and drawing 12 are the sectional views of the pellet pickup apparatus explaining the stage of the beginning of pickup operation. The pickup pellet supporter in the tape mounting surface of a backup holder comprises the movable shaft upper surface. As for the movable shaft, the movable shafts 122, 123, 124, and 125 are formed in concentric circle shape one by one focusing on the movable shaft 121, and the movable shaft 125 is arranged at the re-periphery. First, a pellet pickup apparatus is in an initial state. Next, the movable shafts 121 and 122,123,124 and the 125 whole go up (drawing 11 (a)). Next, an outside movable shaft descends most. And next, the outside movable shafts 124, 123, and 122 descend in order, and make only the central movable shaft 121 the rising state (drawing 11 (b)). A movable shaft is operated in this way. Next, with reference to drawing 12, the operation which takes up a comparatively big semiconductor pellet using this movable shaft is explained.

[0031]In drawing 12 (a), it is the same as other examples by carrying out vacuum suction of the inside of the backup holder 131 that a dicing tape can be adsorbed and fixed. In

this backup holder 131, the movable shafts 132, 133, 134, 135, and 136 by which formation arrangement was carried out on the concentric circle are in the state of the latter part of drawing 11 (a). However, since the opening size of the center section of the backup holder 131 is small, the movable shaft 136 cannot go up. Therefore, since this movable shaft 136 cannot be used actually, a movable shaft becomes four steps of pickup mechanisms seemingly. In drawing 12 (b), the movable shafts 132, 133, 134, 135, and 136 by which formation arrangement was carried out on the concentric circle are in the state of the latter part of drawing 11 (a) in this backup holder 131. However, since the opening size of the center section of the backup holder 131 is small, the movable shafts 134, 135, and 136 cannot go up. Therefore, since these movable shafts 134, 135, and 136 cannot be used actually, a movable shaft becomes two steps of pickup mechanisms seemingly. Thus, if it has many movable shafts, it can be made to correspond to the pickup operation of the semiconductor pellet of various sizes.

[0032]

[Effect of the Invention]This invention becomes possible [taking up without destroying a pellet to a thin semiconductor pellet by the above composition that it cannot be based on a pressure-from-below pin, but can take up].

[Translation done.]